

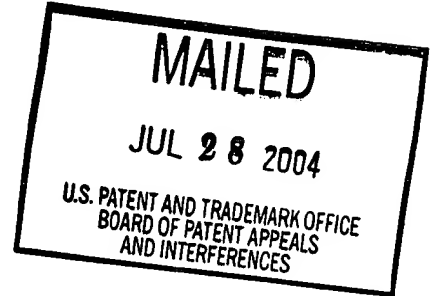
**UNITED STATES PATENT AND TRADEMARK OFFICE**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Ex parte GEORGES SMITS, and LEEN DE LEENHEER

Appeal No. 2004-1498  
Application No. 09/600,732

ON BRIEF



Before SCHEINER, ADAMS, and GREEN, Administrative Patent Judges.

ADAMS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the  
examiner's final rejection of claims 65-70 and 72-97, which are all the claims  
pending in the application.

Claim 65 is illustrative of the subject matter on appeal and is reproduced  
below:

65. In a process for the manufacture of chicory inulin from chicory roots through conventional manufacturing techniques, the improvement which comprises:
  - using as a source material for the process roots of chicory which have been grown in appropriate regions and have been seeded, grown and processed under climatological temperature conditions which are such that during a period of at least from the beginning of the third month of the growing period till the end of the processing of the chicory roots the fructan exohydrolase (FEH) gene in the chicory roots has not been triggered by the occurrence of low temperature conditions which

are such that the temperature in a thermometer shelter shall not have dropped below minus 1°C,

- said chicory roots have had a growing period of at least 150 days,
- said chicory has been seeded
  - in the northern hemisphere within a period selected from the periods ranging from December 1 till March 14, from March 15 till May 14, from May 15 till May 31, from June 1 till June 14, and from June 15 till November 30, provided that when said chicory has been seeded in the periods from May 15 till May 31, and from June 1 till June 14, the chicory roots have had a growing period of at least 180 days, and provided that when said chicory has been seeded in the period from March 15 till May 14, the chicory roots have been grown and processed under climatological conditions wherein, within a period of at least 220 consecutive days immediately preceding the end of the processing of the roots, no low temperature conditions occurred which triggered the FEH gene, and the chicory roots have had a minimum growing period of at least 160 days,
  - in the southern hemisphere within a period selected from the periods ranging from June 1 till September 14, from September 15 till September 30, from October 1 till November 14, from November 15 till November 30, and from December 1 till May 31.

The references relied upon by the examiner are:

Yamazaki et al. (Yamazaki)	4,613,377	Sep. 23, 1986
Van Loo et al. (Van Loo)	5,660,872	Aug. 26, 1997

Van Den Ende et al. (Van Den Ende), "Fructan Synthesizing and Degrading Activities in Chicory Roots (Cichorium intybus L.) during Field-growth, Storage and Forcing," Plant Phys., Vol. 149, pp. 43-50 (1996)

### GROUND OF REJECTION<sup>1</sup>

Claims 65-70, 72-78, and 89-97<sup>2</sup> stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Van Den Ende.

Claims 79-88 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Van Den Ende and Van Loo.

We reverse.

### BACKGROUND

"Inulin is a carbohydrate which occurs in many plants and which can be produced by certain bacteria." Specification, page 1. According to the specification (id.):

Inulin can be generally represented, depending from the terminal carbohydrate unit, by the general formulae  $GF_n$  and  $F_m$ , wherein G represents a glucose unit, F represents a fructose unit, n is an integer representing the number of fructose units linked to the terminal glucose unit, and m is an integer representing the number of fructose units linked to each other in the carbohydrate chain.

The number of saccharide units (fructose and glucose units) in one molecule, i.e. the values  $n+1$  and m in the above formulae, are commonly referred to as the degree of polymerisation [sic], represented by (DP).

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<sup>1</sup> The Answer sets forth a rejection of claims 65-97 under 35 U.S.C. § 112, second paragraph. Answer, page 3. However, on page 9 of the Answer, the examiner indicates that appellants' "arguments [with respect to the rejection under 35 U.S.C. § 112, second paragraph] have been considered and found persuasive and the rejection will fall." We interpret this statement as the rejection under 35 U.S.C. § 112, second paragraph has been withdrawn by the examiner. Accordingly, we have not considered this ground of rejection in our deliberations.

<sup>2</sup> We note that the examiner's statement of the rejection includes claim 71. However, as appellants explain (Brief, page 2), "[c]laim 71 was cancelled in an after final amendment which was entered by the [e]xaminer." According to the examiner (Answer, page 2), "[t]he statement of the status of the claims contained in the brief is correct." Accordingly, we have not considered claim 71 in our deliberations.

The “[m]ain plant sources for inulin are roots of Chicory (*Cichorium intybus*) and tubers from Dahlia and Jerusalem artichoke....” Id. “Inulin can be readily extracted from these plant parts, purified and optionally fractionated to remove impurities, mono- and disaccharides and undesired oligosaccharides, in order to provide various grades of inulin.” Id. According to the specification (bridging paragraph, pages 8-9),

Chicory is conventionally cultivated in certain northern parts of Western Europe, where it is seeded in Spring (usually in April) and the roots are harvested, stored and processed for inulin production [in] late Autumn, usually from about mid September to about [the] end [of] November.... The whole growing and processing period covers about 150 to about 230 days. ... The end of the growing season is the time when the biomass of the roots ceases to increase significantly (i.e. after about 180 to about 200 days of growing), which usually corresponds to the end of October. Towards the end of the growing season, the (DP) and punctual [or average<sup>3</sup>] ( $\overline{DP}$ ) of the inulin in roots remaining in the soil, as well as in harvested and stored roots, are decreasing with time, and the rate of decrease is usually significantly increased from about [the] begin[ing of] November. This situation considerably limits the periods for growing (including seeding and growing) and for processing, including harvesting (harvesting period and harvesting as such), storage, and processing as such, of the chicory roots for the production of inulin, hydrolysates and derivatives of inulin in a technically and economically attractive manner.

Consequently, in spite of the fact that the manufacture of inulin from chicory roots constitutes the most important route to inulin, said manufacture is nevertheless confronted with considerable hurdles and problems, including[, inter alia,] the limited period, including limitations in duration of the period as well as in time period of the year, during which chicory roots can be seeded, grown, harvested, stored and processed for the manufacture of inulin in a technically and economically attractive manner and/or without undergoing a significant decrease of the ( $\overline{DP}$ ) of the inulin in the roots.

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<sup>3</sup> See specification, bridging paragraph, pages 1-2, wherein the symbol “ $\overline{DP}$ ” is identified as the average degree of polymerization.

Thus, according to the specification (bridging paragraph, pages 9-10), “the invention aims to provide a process for the manufacture of chicory inulin, partial hydrolysates, complete hydrolysates and derivatives of inulin, from chicory roots with a growing and/or a processing period which partially or wholly falls outside the conventional ones.

The claims are written in Jepson format. When a claim of this type is asserted, a determination of whether the implied admission that the preamble must be considered as prior art should form a part of the analysis. In re Ehrreich, 590 F.2d 902, 909-10, 200 USPQ 504, 510 (CCPA 1979); In re Fout, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). Appellants’ specification discloses (pages 5-8), “[v]arious processes for the manufacture of inulin from plant sources....” In addition, the preamble of appellants’ independent claims addresses a process for the manufacture of chicory inulin through conventional manufacturing techniques. Accordingly, we find the preamble of appellants’ claims to be an implied admission that conventional manufacturing techniques for chicory inulin is known in the prior art. Therefore, we limit our discussion to the improvement of this process as set forth in appellants’ claimed invention.

#### DISCUSSION

##### Claims 65-70, 72-78 and 89-97:

According to the examiner (Answer, page 4), Yamazaki “teach a method for processing of [sic] chicory inulin from chicory roots through conventional manufacturing techniques, wherein Yamazaki ... disclose that the source material for the process are tubers of Jerusalem artichoke (see column 11, lines

62-66). . . .” While the examiner appears to equate Jerusalem artichoke to chicory, appellants explain (Brief, bridging sentence, pages 9-10) that Yamazaki teach an “aqueous inulin solution is obtained from tubers of Jerusalem artichoke or from chicory roots by extraction with hot water according to a purely conventional process ( . . . col. 10, line 57 to col. 11, line 4).” According to the examiner (Answer, page 4), Yamazaki disclose that the plants should be “harvested in late October and ideally should be processed within a few months. . . .” However, as appellants explain (Brief, page 10), “the process for obtaining the aqueous solution of inulin, including the source chicory roots, disclosed in Yamazaki . . . is completely conventional.” Consistent with appellants’ statement, the examiner finds (Answer, page 5), Yamazaki does not teach appellants’ claimed periods of seeding, growing and processing.

The examiner relies on Van Den Ende to make up for the deficiency in Yamazaki. Of the four points summarized by the examiner (Answer, page 5), we find two to have particular relevance to the merits of the examiner’s rejection. First, the examiner finds (id.), Van Den Ende teach “the source material for the process are roots of chicory grown in appropriate regions and processed under proper climatological temperature which has not triggered fructan exohydroxylase (FEH) in chicory roots (see page 44, column 1, paragraphs 1-4, page 47, column 1, paragraph 2). . . .” The examiner, however, fails to identify the evidence in Van Den Ende that fructan exohydroxylase has not been triggered. In this regard, we note that the passage cited by the examiner, paragraph 2 of the first column of page 47, refers to Van Den Ende’s figure 4. As discussed in

the last two lines of the bridging paragraph of columns 1 and 2 on page 47, the open ("□") symbols set forth in figure 4 illustrate the "real fructan exohydrolase activity," which became significant after October 15th<sup>[4]</sup>." Accordingly, figure 4 of Van Den Ende graphically illustrates the increase in fructan exohydrolase activity. See Figure 4, open ("□") symbols. See also, Van Den Ende, page 48, column 2, second full paragraph, "it is clear that the hydrolase activity in the roots increases after October 15th (Fig. 4). Thus, in our opinion, the evidence relied upon does not support the examiner's assertion. In addition, we note that the growing period from June 1, 1994 through October 15, 1994 is 136 days, which is less than the growing period "of at least 180 days" for plants seeded on June 1 as required by appellants' claimed invention.

Second, the examiner finds (Answer, page 5), Van Den Ende teach "chicory roots were grown for a period of at least 150 days[ ]- 180 days and the [growth] period [is] selected from periods ranging from June 1, July 26<sup>th</sup> to November 3<sup>rd</sup>, October 4<sup>th</sup> to October 25<sup>th</sup>, September 13<sup>th</sup> to December 6<sup>th</sup>] (see page 44, column 1, paragraph 4)...."<sup>5</sup> While the examiner asserts (Answer, page 10), "[t]he broad limitations recited in the instant claim 65 does not exclude any day in a year and overlaps with the periods taught by Van Den Ende et al.,"

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<sup>4</sup> We understand this date to represent a growing period of June 1, 1994 through October 15, 1994. See Van Den Ende, page 44, column 1, last paragraph.

<sup>5</sup> According to Van Den Ende (page 44, column 1, last paragraph), plants were "sown in a local field ... on June 1, 1994. On a weekly basis, nine plants were uprooted to investigate fructan synthesizing (July 26th - November 3rd) and/or fructan degrading (September 13th - December 6th) activities. On two different dates (October 4th and October 25th) a number of plants were uprooted, the leaves were cut off ... and the roots were stored at +1°C for 3 weeks." We understand this to mean that the growth period would be from June 1, 1994 through the date the plants were uprooted for investigation, e.g., June 1, 1994 through July 26<sup>th</sup>, a growth period of 55 days; and June 1, 1994 through December 6<sup>th</sup>, a growth period of 188 days.

according to the proviso set forth in appellants' claimed invention, "when said chicory has been seeded in the period[] ... from June 1 till June 14, the chicory roots have had a growing period of at least 180 days." As set forth in Van Den Ende, (page, 44, column 1, last paragraph), the plants were sown on June 1, 1994. According to the proviso language of the claimed invention, plants sown on June 1, 1994 must have a growing period of at least 180 days. Stated differently, the plants must be grown for the period covering at least June 1, 1994 through November 28, 1994. As we understand Van Den Ende, the growth period for the investigation of fructan degrading activity (June 1 through September 13th – December 6th) would overlap with the claimed range. However, appellants' claimed invention also requires, inter alia, that

during a period of at least from the beginning of the third month of the growing period till the end of the processing of the chicory roots the fructan exohydrolase (FEH) gene in the chicory roots has not been triggered by the occurrence of low temperature conditions which are such that the temperature in a thermometer shelter shall not have dropped below minus 1°C.

As appellants explain (Brief, page 12),

The present inventors have surprisingly found that temperature conditions which trigger the FEH gene may even occur during a certain period of the growing phase, but that, in order to obtain inulin with a desired high ( $\overline{DP}$ ) ..., the FEH triggering temperature conditions may not occur during a specific period of the growing-harvesting-storage-processing period.

The examiner provides no evidence, and we find none, to suggest that Van Den Ende recognized that it is critical that the temperature not drop to the point where the temperature within a thermometer shelter drops below minus 1°C. Van Den Ende, however, does teach that fructan exohydrolase activity increases after



October 15<sup>th</sup>. The examiner provides no explanation as to why this express teaching of an increase in fructan exohydrolase activity (e.g., the triggering of the fructan exohydrolase gene) is not directly counter to appellants' claimed invention. At best, the examiner asserts (Answer, page 12), Van Den Ende "disclose that low temperature be avoided for the cultivation of chicory roots processing includes [sic] storage of roots, which was carried out at +1°C, suggesting no effect of low temperatures." According to the examiner (id.),

The effect of low temperatures on inulin degradation is a limiting parameter which is obvious and known from the prior art cited. Thus the limiting parameter (low or frost temperatures) is known at the filling [sic] of the instant patent application and it is prima facie [sic] obvious to avoid such conditions in the cultivation of chicory roots. Thus it is prima facie [sic] obvious to optimize the cultivating conditions not to fall in the low temperature conditions.

As set forth in In re Antonie, 559 F.2d 618, 619, 195 USPQ 6, 8 (CCPA 1977), "[j]ust as we look to a chemical and its properties when we examine the obviousness of a composition of matter claim, it is this invention as a whole, and not some part of it, which must be obvious under 35 USC [§] 103. Cf. In re Papesch, 50 CCPA 1276, 315 F.2d 381, 137 USPQ 43 (1963)"; In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art."). While the examiner is correct in that "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art," In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980) (citations omitted), we caution the examiner against stretching this general principle to far. In this regard, we remind the examiner that every case, particularly those raising

the issue of obviousness under section 103, must necessarily be decided upon its own facts. In re Jones, 958 F.2d 347, 350, 21 USPQ2d 1941, 1943 (Fed. Cir. 1992). In addition, as set forth in Antonie, F.2d at 621, 195 USPQ at 8:

obvious to try is not the standard of 35 USC 103. In re Tomlinson, 53 CCPA 1421, 363 F.2d 928, 150 USPQ 623 (1966). Disregard for the unobviousness of the results of "obvious to try" experiments disregards the "invention as a whole" concept of §103, In re Dien, 54 CCPA 1027, 371 F.2d 886, 152 USPQ 550 (1967) and In re Wiggins, 55 CCPA 1356, 397 F.2d 356, 158 USPQ 199 (1968), and overemphasis on the routine nature of the data gathering required to arrive at appellant's discovery, after its existence became expected, overlooks the last sentence of §103. In re Saether, 492 F.2d 849, 181 USPQ 36 (CCPA 1974).

On this record, the examiner appears to suggest that it would have been obvious to optimize the conventional manufacture of chicory inulin by avoiding low temperatures as taught by Van Den Ende. The examiner, however, provides no evidence, and we find none, to suggest that Van Den Ende recognized that it is critical that the temperature not drop to the point where the temperature within a thermometer shelter drops below minus 1°C. The examiner offers no evidence to support a conclusion that optimization of the convention chicory inulin process through the use of the teachings of Van Den Ende would have lead a person of ordinary skill in the art to appellants' claimed invention when it is considered as a whole.

We also note the examiner's statement (Answer, page 10), "[t]he analysis of inulin in different growing and processing periods indicates the inulin synthesis and degradation, include the periods (July 26<sup>th</sup> to August 20<sup>th</sup>) (no frost season), where the higher DP inulin was produced." Other than emphasizing that the period of July 26<sup>th</sup> to August 20<sup>th</sup> is a "no frost season" (or a period wherein the

temperature in a thermometer shelter shall not have dropped below minus 1°C), we fail to understand how this statement applies to the claimed invention. The growing period of June 1<sup>st</sup> through July 26<sup>th</sup>; and June 1<sup>st</sup> through August 20<sup>th</sup> is 55 – 80 days, significantly less than the required growing period of at least 180 days, for plants seeded June 1<sup>st</sup>, as set forth in appellants' claimed invention.

We also recognize the examiner's reference to In re Cruciferous Sprout Litigation, 301 F.3d 1343, 64 USPQ2d 1202 (Fed. Cir. 2002), to support the proposition that the "growing conditions in Belgium for the time period reported in Van Den Ende et al. did not fall below 1°C." See Brief, page 15, citing the examiner's Advisory Action. The issue in Cruciferous Sprout Litigation was whether the claimed invention was anticipated under 35 U.S.C. §102(b). See Cruciferous Sprout Litigation, F.3d at 1349, 64 USPQ2d at 1206. In affirming the rejection in Cruciferous Sprout Litigation, the Court found the prior art of record inherently contains the limitations set forth in the claim. Contrary to the issue in Cruciferous Sprout Litigation, the issue before us on this appeal is whether the claimed invention is obvious under 35 U.S.C. §103. As set forth in In re Spormann, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966) "[t]hat which may be inherent is not necessarily known.... Obviousness cannot be predicated on what is unknown". Accordingly, we fail to see the nexus between Cruciferous Sprout Litigation and the issue before us on this record.

Further, we find no reference before us on this appeal that provides an evidentiary basis to support the examiner's assertion the temperature in Heverlee, Belgium did not fall below 1°C during the time period at which Van

Den Ende performed their study. As set forth in In re Lee, 277 F.3d 1338, 1345, 61 USPQ2d 1430, 1435 (Fed. Cir. 2002):

The determination of patentability on the ground of unobviousness is ultimately one of judgment. In furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. The patent examiner and the Board are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of "the person having ordinary skill in the art to which said subject matter pertains," the words of section 103. In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board are presumed to act from this viewpoint. Thus when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record. The failure to do so is not consistent with either effective administrative procedure or effective judicial review. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.

Furthermore, to the extent that the examiner would have relied on a "printout of weather conditions for Brussels, Belgium allegedly to show that growing conditions in Belgium for the time period reported in Van Den Ende et al. did not fall below 1°C," see Brief, page 15; as appellants point out (id.), "[t]he [e]xaminer has failed to establish prima facie that the temperature conditions in Heverlee [the locus of the Van Den Ende's study]... would be the same as the temperature conditions [in] Brussels." In this regard, we remind the examiner that conclusions of obviousness must be based upon facts, not generality. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968); In re Freed, 425 F.2d 785, 788, 165 USPQ 570, 571 (CCPA 1970).

On reflection, we note as set forth in In re Kotzab, 217 F.3d 1365, 1369-70, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000):

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. ... Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher."

...  
Most if not all inventions arise from a combination of old elements. ... Thus, every element of a claimed invention may often be found in the prior art. ... However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. ... Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. [citations omitted]

In other words, "there still must be evidence that 'a skilled artisan ... with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.'" Ecolochem Inc. v. Southern California Edison, 227 F.3d 1361, 1375, 56 USPQ2d 1065, 1075-76 (Fed. Cir. 2000). For the foregoing reasons it is our opinion that the examiner failed to meet his burden of setting forth the evidence necessary to establish a prima facie case of obviousness. Accordingly, we reverse the rejection of claims 65-70, 72-78, and 89-97 under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Van Den Ende.

### Claims 79-88:

According to the examiner (Answer, page 8), “neither Yamazaki et al. nor Van Den Ende et al. teach the production of inulin free of monomeric saccharides, dimeric saccharides or oligofructose.” Accordingly, the examiner relies on Van Loo to teach these limitations. Van Loo, however, fails to make up for the deficiency in the combination of Yamazaki and Van Den Ende as discussed above.

Therefore, we reverse the rejection of claims 79-88 under 35 U.S.C. § 103 as being unpatentable over Yamazaki in view of Van Den Ende and Van Loo.

Having determined that the examiner has not established a prima facie case of obviousness, we find it unnecessary to discuss appellants' arguments (Brief, page 20) concerning unexpected results, relied on by appellants to rebut any such prima facie case.

REVERSED

John R. Scherner

**Toni R. Scheiner**  
**Administrative Patent Judge**

*Paul E. Adams*

Donald E. Adams  
Administrative Patent Judge

Yra M. Lu

Lora M. Green  
Administrative Patent Judge

BOARD OF PATENT

## APPEALS AND

## INTERFERENCES

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